Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

been made, monoecious prothallia were observed. The prothallia continued to grow for ten to eleven weeks and developed many adventitious outgrowths bearing antheridia. Young sporophytes were also developed.

In summing up, therefore, it may be said: monoecious prothallia, as well as dioecious prothallia, were observed in soil cultures; monoecious prothallia were obtained from "female" prothallia transferred at a ten-celled stage from distilled water to KNOP'S solution; monoecious prothallia were obtained by transferring "female" prothallia from the soil to a nutritive solution; they were also obtained by transferring prothallia from one nutritive solution to another.

The experimental work of this paper was done in the botanical laboratory of the University of Michigan. I wish to express my indebtedness to Dr. C. H. KAUFFMAN, who suggested the problem and under whose guidance and inspiration the work was carried on.—ELIZABETH DOROTHY WUIST, *University of Michigan.*

CECIDOLOGY IN AMERICA

Botanists are usually interested in the malformation of plants, and some of the earliest literature contains references to these abnormal structures. However, cecidology is one of the latest of the biological sciences to be developed. The literature is so involved with other branches of biology that only those who have given special attention to the subject can have a very clear conception of the dimensions of modern cecidology and the character of its problems. The entomologists have given far more attention to the subject, in both Europe and America, than any other group of scientists. For this reason many have come to consider cecidology as a branch of entomology, while as a matter of fact the entomologist has much greater interest in the insects than in the galls.

Cecidology now includes all hypertrophies caused by specific organisms, as insects, nematodes, fungi, and bacteria. It has been suggested that the term "gall," which has been in use since the sixteenth century, be discontinued and the word *cecidium* be substituted; also that the structures caused by these different organisms be designated as diptero-cecidia, phyto-cecidia, nemato-cecidia, myco-cecidia, etc. Some writers have been inclined to include that very much confused and mysterious class of diseases known as teratology under the head of cecidology, and there appears to be no conclusive argument as to why it should or should not be so considered.

The early literature is so thoroughly involved with other subjects as to be practically unavailable to the general students, many valuable references being found in papers upon other subjects, with nothing whatever in the titles to indicate their presence. For this reason many workers in both botany and entomology have frequently thrown aside interesting material.

A brief résumé of the subject may be of interest to the students of botany. Very little work was done and very few papers published before 1861, when C. R. von Osten-Sacken, of the foreign diplomatic service in Washington, began the publication of a series of papers which appeared in the Proceedings of the Entomological Society of Philadelphia, various U. S. government publications, Smithsonian Institution publications, etc. Since that time many entomologists have published valuable papers on this subject and also many important notes in connection with papers on other phases of entomology. Up to the present time there have been about 125 workers who have given some attention to this subject in North America, and they have published approximately 350 papers and notes.

In Europe the subject is very little older than in America, but has attracted the attention of far more workers. Although there have been approximately 350 workers, who have issued about 1200 publications, not more than 100 were published before 1861, which date may be considered the beginning of the subject in this country. It is also true that the greater part of the work in Europe has been done by the entomologists, but in recent years a great deal of attention has been devoted to the study of the cecidia themselves.

From the viewpoint of the botanist, cecidology presents a most interesting field for research. Both botanist and entomologist are continually confusing the cecidia caused by fungi and insects, and the confused state of the literature has led to the neglect or abandonment of many interesting problems. The fact that most of the work has been done by the entomologist has made the literature somewhat inaccessible to the botanist, and has also given the younger botanists a misconception of the character of the subject.

Not only has the confusion caused the neglect and abandonment of problems, but has caused some rather interesting and amusing statements as the result of misinterpretations. This may be illustrated by *Bucida buceras*, a tropical plant which produces two kinds of fruits, one small and the other long. Both names (*Bucida* proposed by Linnaeus in 1759 and *buceras* by P. Browne in 1756) are derived from the long fruits, which authors considered as resembling the horn of a bull. However, recent studies have shown that the long fruits were hypertrophied as the result of mite injuries.[3]

Cecidology is not only closely interwoven with entomology, but also with mycology, bacteriology, plant pathology, and plant physiology. The connection with entomology is fully appreciated and needs no comment at this time. Many fungi produce cecidia, but the character of these cecidia have received as little or less attention from the mycologist than the insect cecidia from the entomologist. The cecidia on the roots of legumes and the recent investigations of SMITH and TOWNSEND on crown galls demonstrate the relationship to bacteriology. Since the cecidia from whatever cause are pathological conditions of the plants, cecidology becomes a well-defined part of plant pathology. Until recently, plant pathology has been more especially interested with the cause and control of diseases, in fact has been a branch of mycology. However, with the further progress of the subject we must come more and more to recognize the necessity of a study of the pathological condition of the plant. This feature of the work will involve the most careful and exact methods of the plant physiologist. However, the connection of cecidology with physiology is not only through pathology, but direct. There is that long-mooted question concerning the character of the stimuli in the formation of cecidia, which has never been answered satisfactorily.

---

[3] Britton, N. L., The generic name Bucida; and Cook, Mel. T., The hypertrophied fruit of *Bucida buceras*. Bull. Torr. Bot. Club **35**:303–306. 1908.

An explanation of the character of the stimuli in the formation of myco-cecidia might give some aid in answering the question, and this latter problem is undoubtedly within the province of plant physiology. The explanation of why injuries result in hypertrophies in some cases and atrophies in others is also an interesting problem for some ambitious student of botany. The fact that "the morphological character of the gall depends upon the genus of the insect producing it rather than upon the plant on which it is produced," as demonstrated by the writer,[4] suggests an interesting field of investigation. The so-called evolution of the cecidia may be a response to physiological conditions rather than to evolutionary factors.

The distribution of cecidia as compared with the distribution of the host plant furnishes a good supply of work for the ecologist, while the injurious character and valuable properties of many cecidia will give profitable fields for the economic phases of the biological sciences.

The greatest need of cecidology in America at the present time is the cataloguing and indexing of the literature and the indexing of the cecidia with reference both to the causes and to the host plants. To this should be added up-to-date, available descriptions of the cecidia and the organisms which cause them. Some work along this line has been done by Mr. WM. BEUTENMÜLLER of the American Museum of Natural History, and by the writer.

---

[4] COOK, MEL. T., Galls and insects producing them. Ohio Naturalist 2:263–278. 1901.

There is at the present time one international publication devoted entirely to cecidology, *Marcellia*, now in its eighth volume, edited by Dr. A. TROTTER, Avellino, Italy, which publishes original papers and also current bibliography.— MEL. T. COOK, *Delaware Agric. Exper. Station, Newark.*

FIXING AND STAINING TANNIN IN PLANT TISSUES WITH NITROUS ETHERS

(WITH EIGHT FIGURES)

Immature dates exposed to the vapor of amyl or ethyl nitrite to stimulate premature ripening were observed to turn dark brown very rapidly. This was found to result from the staining of the giant tannin cells which occur near the cuticle. After several hours' exposure, hard tannin grains were formed in the tannin cells of green dates and persimmons, which had the same physical characters as the grains occurring naturally in ripe fruit; they could be separated quite pure by gravity in water, and when pressed beneath the cover glass fractured like grains of gelatin.

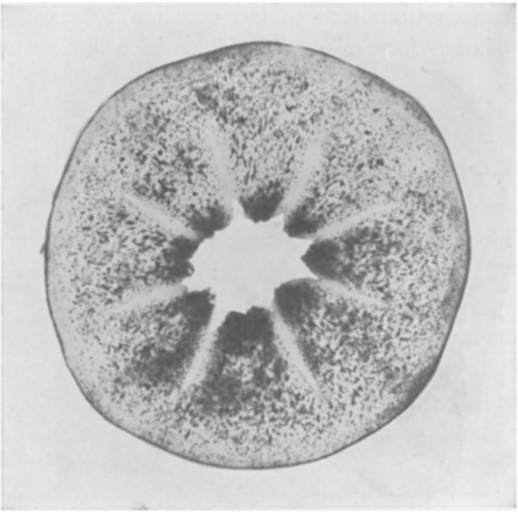

FIG. 1.—Japanese persimmon.

The juice of the unripe date gives a dense brown precipitate with ethyl or amyl nitrite or with sodium nitrite and free acid. Persimmon juice gives an intense deep wine-red color, but no precipitate. Tannic and gallic acids give yellow, while phloroglucin and some other higher phenols give a red color very similar to that given by date or persimmon juice. Phloroglucin also gives a precipitate, but it does not correspond in appearance with that given by date juice. The other higher phenols also give yellow or red color reactions with nitrous ether. The gummy matter, pectin, etc., precipitated from the juice by alcohol carries with it much of the substance that reacts with the nitrite, and the color given by this pre-